severe design alone will suit the locality, which we will presently describe, and may safely be left to the discretion of a committee of taste by a general meeting of the subscribers to the memorial as only a small sum of money need be expended on this object; but we would ask if this alone will appease the manes of Edmund Halley? We must give further explanations.

Within sight of Halley's Mount are *two* disestablished observatories. One, the most important, is that on Ladder Hill, with this inscription over the doorway: "HÆC SPECULA ASTRONOMICA Condita fuit A.D. MDCCCVII." This was Johnson's observatory, broken up when the Imperial Government took the island from the East India Company in 1834. It is now used as a mess-room for the officers, R.A. and R.E., at Ladder Hill.[1] The other is at Longwood, and was established in 1840 by Sabine as a magnetic and meteorological observatory; this station was broken up in 1845. In front of it on Deadwood Plain is the base-line measured by Lefroy, 2,986·3 yards in length.

The re-establishment of these valuable observing stations would indeed be a lasting memorial such as Halley would approve. Of the fitness of the first-named station as an astronomical observatory, we need only judge from the actual work accomplished there by Johnson and by Gill's appreciation of its position and capabilities. Of the second it will be manifest to all meteorologists, what an advantage such an establishment in the heart of the south-east trades would be to science; whilst Halley's magnetical researches could be renewed in an island where the atmospherical electricity is so seldom disturbed that lightning conductors are never fitted to the powder magazines, and where distant thunder is heard seldom more than once in a generation.[2]

A few more words may not be out of place to describe Halley's Mount. Nearly in the centre of the island it commands from its elevation of 2,400 feet, the whole of the northern portion of St. Helena. Four miles looking due north is the northern extremity of the island called Sugar-loaf, and four miles to the right is Dry-gut Bay and Stone-top, whilst the same distance to the left or west, is Bennett's Point. Throughout the whole of this northern semicircle, the view is bounded only by the sea horizon. Behind us the crateral ridge just under 3,000 feet hides the southern coast, which is distant only three miles in Sandy Bay. But although this ridge hides the view, it forms a fine background and shelter against the southern winds. Above Halley's Mount the mountain-tops are covered with indigenous vegetation, shrubby Campanulaceæ, Scævoleæ, mosses, lycopods, and arborescent Dicksonias, and the peculiar composite trees with cauliflower-like blossoms, much the same as when Halley was here two centuries ago; but beneath us, how changed. As Sir Joseph Hooker observed in a lecture on "Insular Floras," at the Nottingham meeting of the British Association in 1866, in reference to St. Helena:—"When discovered about 360 years ago, it was entirely covered with forests, the trees drooping over the tremendous precipices that overhang the sea. Now all is changed, fully five-sixths of the island are utterly barren, and by far the greater part of the vegetation which exists, whether herbs, shrubs, or trees, consists of introduced European, American, African, and Australian plants." On Halley's Mount the indigenous and exotic plants meet on equal terms, a fit vegetation to surround a cosmopolitan relic.

In the present day the most conspicuous features in the landscape of St. Helena, as viewed from the highlands, are the sombre plantations of pinaster (only introduced in 1787), which contrast strongly with the willow-leaved acacias of New South Wales; whilst on all sides are ever wider extending acres of *Phormium tenax*, grown for the sake of its economical fibre, and whose seeds afford capital fare to the numerous Chinese pheasants which inhabit the covers on the sides of Halley's Mount.

THE U.S. WEATHER MAPS

We are again enabled, through the courtesy of Gen. Myer, of Washington, to present our readers with two Weather Maps of the War Department of the United States, which graphically present the mean pressure and temperature for the whole of the Northern Hemisphere of the earth for April, 1878, and the tracks of the centres of storms for the same month. As these maps are constructed from the observations of all the stations reporting to the Army Signal Service, they must be held as very accurately representing the meteorology of the period, and they may serve to show the extraordinary energy with which this well-directed meteorological system is conducted and turned to account in the interests of the public and of science.

The outstanding characteristic of the weather of 1878 was its extraordinarily high temperature to the east of the Rocky Mountains, chiefly in the upper valleys of the Missouri and Mississippi, and the Lakes region, rising in the latter to nearly 11°·0 above the mean of the month. April is one of the months in which the western prairies receive their annual maximum of rain, but during April, 1878, this maximum rose greatly above its normal amount, the rainfall of the basins of the Mississippi and its affluents, with the exception of Ohio, being generously large. In Minnesota the fall was nearly four inches in excess of the average. The region of absolutely heaviest rainfall covered a broad track extending from St. Louis, Mo., to Florida.

These characteristics of the distribution of the temperature and rainfall were impressively felt in the singular distribution of atmospheric pressure, which everywhere was under the average of April, but most pronouncedly so to the west and north-west of the regions of the extreme excess of temperature and rainfall. The deficiency at Omaha amounted to fully two-tenths of an inch, an unusual deficiency for that region and season.

Turning now to the map of the tracks of the centres of the storms of April, 1878, we observe that most of them group together and lingered longest in this very region of low pressure, and that immediately to the *east and south-east* lay those regions where temperatures ranged so unusually high, rain fell so copiously, and thunderstorms played so strikingly brilliant a *rôle* among the weather phenomena of the month.

These tracks of the different storm centres admirably illustrate some of the more prominent types of the States' storms. Storm No. I. is seen to branch into two shortly after it began its advance on the States, the one passing northwards and dying out after one day's course, near the Cumberland River, whilst the other pursued a north-easterly course toward Newfoundland. No. II. originated to the east of Pike's Peak, and after a two days' course to north-north-east, was lost sight of in Canada for want of the observations necessary to trace its course over that part of the Dominion. Whilst this storm had its centre over Minnesota, a deep barometric trough ran southward into the Gulf of Mexico—a feature of American storms of no unfrequent occurrence—and the rain area extended eastward over the lakes, the middle, and South Atlantic States, with frequent heavy thunderstorms, accompanied with hail. Storms IV. and V. illustrate the coalescence

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the south Crux. On the east the inferior planets, and on the west the comet. On the twelve seats are the signs of the Zodiac (has any one remarked that the conventional signs of the Zodiac have become a recognised ornamental pattern on the jewellery made by the natives on the west coast of Africa?) and the names of astronomical workers in the southern hemisphere.

[1] See "Six Months at Ascension," p. 26. David Gill's feelings at viewing this degraded observatory, remind us of Halley's disappointment on reaching Greenwich, on his appointment as King's Astronomer, 1720, and finding that the executors of Flamsteed had removed all the instruments. See Whewell's "Inductive Science," vol. ii. Compare also the desolation of Uraniburg.

[2] We have not been able to ascertain in which observatory Capt. Foster's pendulum experiments were carried on between 1828-1831, but we presume in Johnson's observatory; nor are we sure where Maskelyne's station was.

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of two storms; storms V. and VI. advanced from the Pacific, crossed California and the Rocky Mountains, and thence swept eastward over the States; and storm VIII. began its course near Chicago, ran out south-eastward to near Cape Hatteras, and then recurved in the direction of Niagara, where it died out after having traced a course nearly elliptical. It is to an exhaustive treatment of a tolerably large number of instances of these different types of storms, that we must look for the key of the mystery of the genesis, progress, and termination of the cyclone which comprehends within itself by far the major portion of all weather changes. Towards this great and perhaps not far distant result, nowhere is any meteorological system making contributions so large and so effective as is Gen. Myer through the munificent liberality of the United States Government.

DIFFUSION OF COPPER IN THE ANIMAL KINGDOM

THE fact of the normal presence of minute quantities of copper in various members of the animal kingdom has been noticed by several chemists within the past twenty-five years. Kingzett states that he has invariably found it to be a constituent of the human brain, while Odling and Dupré, and Bergeron and Hôté have determined analytically the average amount of copper present in the liver and kidneys of human beings and domestic animals. In the latter case the average percentage of copper found was about 35 millionths. Some two years since Cloez examined the blood of a deer, and found it to contain 6 millionths of copper. The most interesting instance of the occurrence of copper in the animal creation is, however, that communicated by Prof. Church to the Royal Society in 1869. At this time he was engaged in the investigation of a peculiar, soluble, red colouring matter present in the wings of the Turaco, a bird from the West Coast of Africa. A thorough study of this pigment showed it to contain 5·8 per cent. of copper, and Prof. Church established for it the formula $C_{50}H_{56}O_{19}NCu$. Led to seek the source of this strange factor in the animal economy of the Turaco, he succeeded in detecting copper in the fruit of the *Musa sapientum*, which forms the chief article of the bird's diet.

To these few isolated cases of the normal assimilation of copper in the animal kingdom, Dr. M. Giunti, in the last fascicule of the *Gazetta Chimica Italiana* (vol. ix. p.541), adds a number of interesting and diversified instances.

His attention was first directed to the subject accidentally by finding over one-third of 1 per cent. of copper in the guano deposits from bats occurring in certain Italian caves. This led to an analytical examination of the bat, the results of which showed that about four ten-thousandths of the weight of the ashes of this animal consist of cupric oxide. Still bent upon finding a more ultimate source for the metal, Giunti has subjected to analysis quantities of the insects which form the food of the bat, and in all cases he has found copper present in greater or less amount. The quantity would seem to vary in the different orders, families, and species. Aquatic insects contain less than those found on land, and the Coleoptera appear to yield the highest percentage. Thus the ashes of *Anomola vitis* contain 0·1 per cent. of cupric oxide, and those of *Blatta orientalis* 0·826 per cent. High as this percentage seems, the amount of copper in an individual insect is infinitesimal, being, in the case of *Anomala vitis*, less than four-millionths of a gramme. Copper was also detected amongst other Coleoptera (such as *Cetonie*, *Cerambix*, *Ateucus sacer*, *Leurus striatus*, and notably the lava of *Srillotalpa*); amongst Diptera (*Mosca domestica*), Lepidoptera (*Vanessa cardui*, *Piaris sinapis*, *Limenites camilla*, &c.), and Hymenoptera (*Æschena maculatissima*, *Libellula depressa*, *Calabroni*, &c.).

Giunti has next sought to ascertain whether other insectivorous animals besides the bat are wont to assimilate the copper present in their insect prey. This was found to be the case with all members of this class subjected to examination, such as snakes, lizards, urchins, &c. The ashes of the latter contain from one to two ten-thousandths of copper, while the ashes of lizards contain over fifteen thousandths. In their case most of the copper is to be found in the skin of the animal.

Giunti's experiments have likewise been extended amongst the invertebrates. Various varieties of spiders; of myriapods, such as *Julus terrestris*; of isopods, such as *Armadillidium vulgare*; and of snails, have all given affirmative responses to his tests. Amongst these, *Julus terrestris* contains the largest amount of copper, its ashes showing a percentage of 0·18.

The investigations of the Italian chemist in this novel branch of physiological chemistry are still being continued, and it is to be hoped that more extended observations will inform us of the exact nature of the *rôle* played by cupric compounds in the animal economy.

T. H. NORTON

NOTES

NEXT week we publish an extra number entirely devoted to an account of the life and work of M. Dumas, the eminent French chemist, and one of the greatest of living Scientific Worthies. Dr. Hofmann, of Berlin, has been good enough to devote a great deal of time and research to this paper, and has treated the important subject in such detail that, owing to the pressure on our space at present, it is impossible for us to find room for this long article in the ordinary way, and we are therefore compelled to devote to it an extra number. We are sure our subscribers will give us their willing approval and support in an emergency so very special, and all will doubtless be glad to have this sketch of an eminent French chemist by so eminent a German *confrère*.

A PAPER has been circulated by the Perpetual Secretary of the Paris Academy giving notice that M. Maindron has been officially commissioned to collect under their authority the archives of the Academy, in a locality belonging to the Institute. Persons possessing documents available for that purpose are requested in the name of science kindly to send them. A fair example has been recently given by M. Bornet, whose liberality has been publicly acknowledged. M. Etienne Charavay, the expert in autographs, has recovered on behalf of the Institute a number of documents which had belonged to the Academy.

THE Society for the Promotion of Hellenic Studies, which was inaugurated in June last, held its second general meeting on Thursday, January 22, at 7, Adelphi Terrace, Mr. C. T. Newton in the chair, when the rules drawn up by the Committee were adopted, the Bishop of Durham elected President, and other officers settled as follows:—Vice-Presidents: Lord Morley, Mr. Justice Bowen, the Dean of St. Paul's, M. Gannadius, Mr. Newton, Mr. E. Maunde Thompson, the Master of Trinity College, Cambridge, Prof. Colvin, Rev. H. F. Tozer. Prof. Sayce, Prof. Jebb, and Prof. T. K. Ingram. Council: The Bishop of Lincoln, the Dean of Westminster, the Dean of Christchurch, the Rector of Lincoln College, Oxford, Sir John Lubbock (Treasurer), Sir Charles Dilke, Professors Bryce, Hort, Kennedy, Mahaffy, B. Price, H. J. S. Smith, Tyrrell, Messrs. A. J. Balfour, M.P., Oscar Browning, J. Bywater, W. W. Capes, H. O. Coxe, T. Chenery, E. A. Freeman, Percy Gardner, George Macmillan (Hon. Sec.), Ernest Myers, D. B. Monro, J. Cotter Morison, H. F. Pelham, F. C. Penrose, Walter Perry, J. A. Symonds, and Oscar Wilde. The objects of the Society, as stated in the outset of the Rules, are:—1. To advance the study of Greek language, literature, and art,

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